

Claims

1. An apparatus for separation of solids in froth, including

– a housing (1), delimited by two upper side walls (18), two upper end walls (10) and a mainly funnel shaped bottom (12), the housing (1) establishing a chamber (2) for flows of liquid and solid material and a froth bed (30) on the liquid,

– feeding means (14) for getting incoming material to be separated in contact with said froth bed (30),

– discharging means (6) for solid material near the bottom (12) of said housing (1),

– aerator means (24, 26) under the liquid surface (78) for creating bubbles and thus forming said froth bed (30) on the liquid in the apparatus, said aerator means (24, 26) being constructed to generate a vertical flux of bubbles substantially nonhomogenous in a horizontal cross-section of the chamber (2), to generate a moving bed of froth (30) on the liquid,

– means for discharging froth from the housing (1) including at least a froth outlet (74),

characterized by a surface (32) connected to said feeding means (14) so as to reduce the vertical speed component of the material being fed with the feeding means (14) from above said froth bed in and on to said froth bed (30).

2. An apparatus as claimed in claim 1, **characterized** by the aerator means including two or more at least partly one above another installed bubble generators (24, 26), each of the bubble generators by itself creating in the horizontal cross-section homogenous flow of bubbles, the main bubble generator (24) covering substantially the whole length of a horizontal section of the chamber (2) in the direction of the froth motion, and the one or more additional bubble generators (26) covering 2/3 or less of the length of the chamber (2) in the direction of the froth motion starting from the start point of the horizontal froth motion.

3. An apparatus as claimed in claim 1, **characterized** by the aerator means (24, 26) including an aerator (24) that is inclined downwards by an angle up to 30 degrees from the horizontal level in the direction of the froth motion.

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4. An apparatus as claimed in claim 1, **characterized** by a plate (28) being installed above the part of the chamber (2) where the vertical flow of bubbles from the aerator means (24, 26) has its maximum, said plate (28) being inclined upwards in the direction of the froth motion, so that the vertical motion of the rising bubbles is
10 turned into a horizontal motion of the froth bed (30) in a direction towards the froth outlet.

5. An apparatus as claimed in claim 1, **characterized** by, that one or more vertical plates (40) are installed inside the chamber (2) substantially parallel to the direction
15 of the froth motion, and said plates (40) covering substantially the whole length of a horizontal section of the chamber (2).

6. An apparatus as claimed in claim 1, **characterized** by the apparatus including two or more chambers (2) for flows of liquid and solid material and a froth bed (30)
20 on the liquid, said two or more chambers (2) being partly separated from each other by at least one partition (8) placed parallel to and between the two upper end walls (10), said two or more chambers (2) being connected with each other in liquid.

7. An apparatus as claimed in claim 1, **characterized** by, that the feeding
25 means (14) are installed above an end wall (10) or above a partition (8) between the two end walls (10), said feeding means (14) being installed so that the feed material from said feeding means (14) is distributed substantially equally along the whole length of the said end wall (10) or partition (8).

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8. An apparatus as claimed in claim 1, **characterized** by that under the aerator means (24, 26) a flat parallel electrode system (42) for electrolysis is installed.

9. An apparatus as claimed in claim 1, **characterized** by that the apparatus includes means (16, 22) for adjusting the amount of liquid discharged from the housing (1), to be able to adjust the liquid level (78) in the housing (1) and/or to adjust the height (38) of the froth bed.

10. An apparatus as claimed in claim 1, **characterized** by a froth receiver (66) being installed at the froth outlet (74), said froth receiver (66) having an inclined and at least partly perforated bottom (68).

11. An apparatus as claimed in claim 1, **characterized** by the feeding means (14) including a primary chamber (44) with an inclined perforated bottom (46), said primary chamber (44) being connected to an inclined gutter (50) divided by longitudinal partitions (56); said gutter (50) being assembled to be vibrated during use, and the longitudinal sides (58) of the gutter bottom being inclined downwards towards the chamber (2).

12. An apparatus as claimed in claim 1, **characterized** by said feeding means (14) including a longitudinal edge (34) mainly transverse to the direction of the froth motion, said edge (34) being used for increasing contact area between the feed material and the froth bed (30), over which edge (34) feed material is transported to be fed in and on to the froth bed (30).

13. An apparatus as claimed in claim 12, **characterized** by said longitudinal edge (34) being shaped like a comb or similar with its teeth (36) pointing in the direction of the froth motion.